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(54) ELEVATOR SYSTEM HAVING A DOUBLE-DECKER

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(58) **Field of Classification Search**
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USPC 187/249
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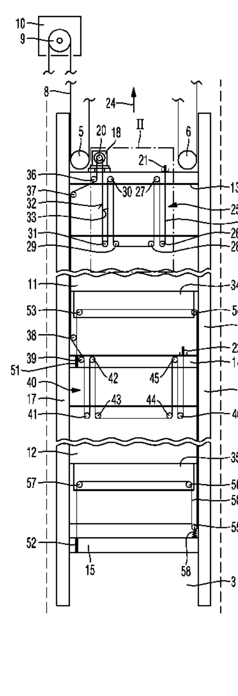
(57) **ABSTRACT**

An elevator system includes an elevator car support displaceable in a travel area provided for the travel of the elevator car support, and a first elevator car and a second elevator car, each car adjustably disposed on the elevator car support. A drive unit is further disposed on the elevator car support. A belt is also provided. The first elevator car and the second elevator car are thereby adjustable in opposite directions by the drive unit by the belt relative to the elevator car support.

13 Claims, 2 Drawing Sheets



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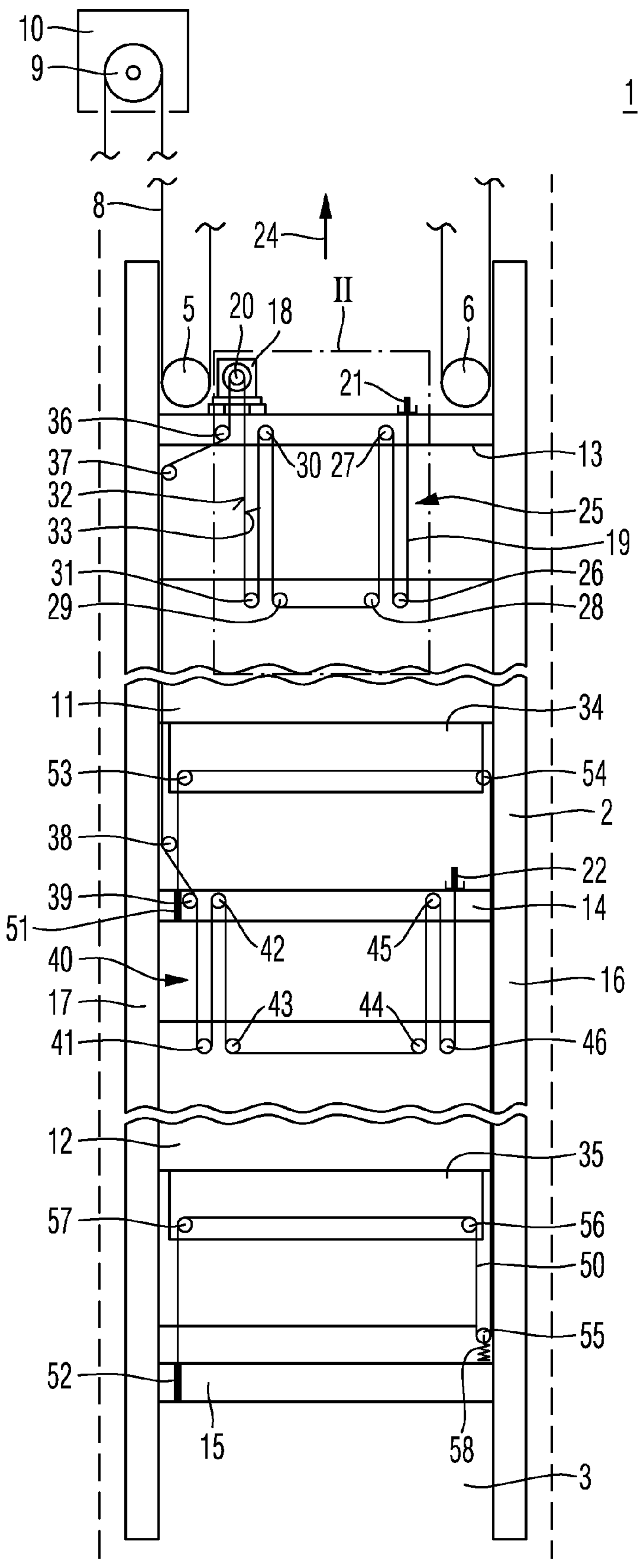
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Fig. 1

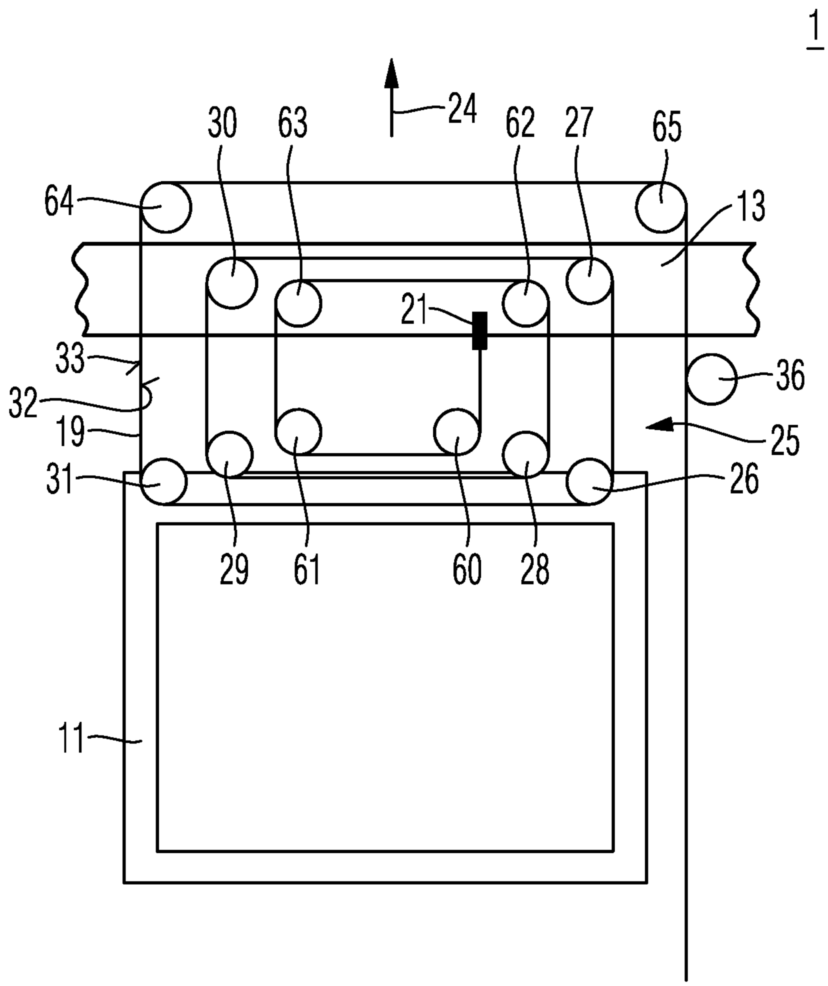
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Fig. 2

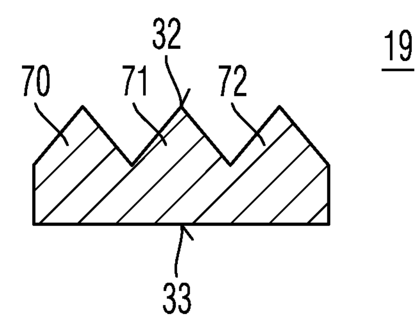
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Fig. 3

ELEVATOR SYSTEM HAVING A DOUBLE-DECKER

FIELD

The invention relates to an elevator system having at least one elevator car support that can hold two or more elevator cars. The invention relates specifically to the field of elevator systems designed as so-called double-decker elevator systems.

BACKGROUND

JP 2007-331871 A discloses a double-decker elevator. The known elevator has a car frame in which two elevator cars are arranged one vertically above the other. The two elevator cars each stand on a support with sheaves, lifting cables being guided around the sheaves. A drive unit, around which the lifting cable is guided, is moreover provided on the car frame. By actuating the lifting cable by means of the drive unit, the elevator cars suspended in this way can be raised and lowered relative to the car frame. As a result, the two elevator cars can be positioned differently inside the car frame.

The double-decker elevator known from JP 2007-331871 A has the disadvantage that the mechanism provided for suspending and adjusting the elevator cars requires a relatively large amount of space. For example, the sheaves of the top elevator car, on which the top elevator car is suspended, require a certain structural space that, in the case of a predetermined structural space for the car frame, restricts the remaining space for the elevator car both vertically and horizontally. This also applies to the bottom elevator car. Specifically with respect to the architecturally predetermined shaft dimensions, this thus results in a reduced cross-section remaining for the elevator cars, which entails smaller elevator cars. Moreover, the space required vertically is also increased, which imposes additional demands on the design of the elevator shaft in terms of its end regions.

SUMMARY

An object of the invention is to provide an elevator system which has an improved structure. Specifically, an object of the invention is to provide an elevator system in which the space remaining for the elevator cars is optimized and the two elevator cars can be adjusted relative to each other advantageously.

In the design of the elevator system, the elevator car support can advantageously be arranged in an elevator shaft, a drive motor unit being provided which serves to actuate the elevator car support. As a result, the elevator car support can be displaced along the travel path provided. The elevator car support can hereby be suspended from a traction means connected to the elevator car support. The traction means can hereby be guided in a suitable fashion over a drive pulley of a drive motor unit. As well as having the function of transmitting the force or the torque from the drive motor unit to the elevator car support in order to actuate the elevator car support, the traction means can here also have the function of carrying the elevator car support. Actuation of the elevator car support is hereby understood in particular as raising or lowering the elevator car support in the elevator shaft. The elevator car support can thus be guided in the elevator shaft by one or more guide rails.

It is advantageous that sheaves, about which the belt is guided, are attached to the first elevator car, that at least one sheave, about which the belt is guided, is attached to the elevator car support, and that the belt with the sheaves attached to the first elevator car and the sheave attached to the elevator car support forms a pulley system for adjusting the first elevator car. As a result, the torque applied by the drive unit to adjust the first elevator car can be reduced. As a result, the power required by the drive unit can be reduced.

An optimized design is possible as a result of the interaction of the belt with the sheaves. In the case of multiple suspension from a belt, a belt with tension members which have a diameter of 1.7 mm, in combination with a sheave pitch diameter of 87 mm, can for example be formed, the belt height being approximately 3 mm. By way of comparison, in the case of a design with a cable hoist, the cable diameter is for example 8 mm and the pitch diameter of the cable pulley 240 mm. The structural space required is thus considerably reduced.

It is advantageous that the second elevator car is arranged adjustably on the elevator car support, that the second elevator car can be adjusted relative to the elevator car support by the drive unit by means of the belt, and that, when the first elevator car and the second elevator car are adjusted relative to the elevator car support, the first elevator car and the second elevator car can be adjusted in opposing directions of adjustment. Moreover, it is hereby advantageous that sheaves, on which the second elevator car is suspended via the belt, are arranged on the elevator car support. The two elevator cars can thus be adjusted relative to each other simultaneously by driving the belt. Because the two elevator cars are adjusted in opposite directions, the speeds of the adjusting movements of the two elevator cars are added together in terms of a change in the distance between the two elevator cars.

It is advantageous that the belt has a first side and a second side averted from the first side, and that the first side serves as a contact side on which the belt is guided about a drive wheel of the drive unit and about sheaves and with respect to which the belt is deflected, and that the second side serves as a free back side with respect to which the belt is at least substantially not deflected. As a result, reverse deflections in the belt can be at least largely avoided. However, one or more guide sheaves can be provided which interact with the free back side of the belt in order to guide the belt. Such a guide sheave can, for example, be arranged on the elevator car support. Specifically, the belt can be guided in the same direction about the drive wheel and the sheaves. This design is especially advantageous in the case of a profiled belt.

In particular, in the case of the belt being guided in the same direction, a first end of the belt is connected to a cross-member of the elevator car support. The belt is guided from its first end to at least two sheaves which are fastened to the first elevator car. The belt is also guided to at least two sheaves which are fastened to the cross-member. The belt is guided onwards downwards along the side of the first elevator car. Between its first end and the sheaves attached to the cross-member, the belt thus forms a loop in which the first elevator car is suspended. In such a guide arrangement for the belt, the belt is deflected about the sheaves substantially in the same direction.

In a further embodiment of the guidance of the belt in the same direction, two additional sheaves are fastened to the cross-member and two additional sheaves to the first elevator car. The first end of the belt is likewise hereby connected to the cross-member and, as described above, guided to two sheaves on the first elevator car and then to two sheaves on the cross-member, the belt forming a first loop. The belt is guided onwards to the two additional sheaves on the first elevator car and from there to the two additional sheaves on the cross-member. The belt thus forms a second loop in which the first elevator car is suspended. Lastly, the belt is guided downwards along the side of the first elevator car. The arrangement of the additional sheaves on the cross-member and on the elevator car is designed in such a way that the two loops of the belt are guided so that they do not clash. This can be achieved by the additional sheaves on the first elevator car being arranged respectively offset horizontally and/or vertically on the cross-member. Three or more loops can be formed by arranging other sheaves on the cross-member and on the first elevator car.

In a corresponding fashion, the second elevator car can be suspended in the same direction in one or more loops of the belt on a further cross-member. For this purpose, at least two sheaves are fastened to the second elevator car and a second end of the belt is connected to the further cross-member. The belt is guided from its second end to the two sheaves on the second elevator car and from there upwards along the side of the second elevator car. A second and further loops can in each case be formed by means of two additional sheaves on the further cross-member and by means of two additional sheaves on the second elevator car.

It is, however, also advantageous that the belt has a first side and a second side averted from the first side, that the first side serves as a first contact side on which the belt is guided about a drive wheel of the drive unit and about sheaves and with respect to which the belt is deflected, and that the second side serves as a second contact side with respect to which the belt is guided about sheaves and with respect to which the belt is deflected. As a result, the space required for the arrangement of the belt and the sheaves inside the elevator car support can be optimized. A desired pulley system can optionally also be formed with a reduced number of sheaves. This design is especially suitable for a flat belt or a belt that is profiled on both sides.

It is advantageous that the belt has at least one rib on at least one contact side. The rib can specifically hereby have a V-shaped profile. Multiple ribs are preferably formed on the contact side and are each at least approximately V-shaped. Other forms for the profile of the rib are also possible. The rib can, for example, have a trapezoidal profile.

It is also advantageous that a further belt is provided which holds the first and second elevator car from below. A first end of the further belt is hereby connected to the elevator car support and a second end of the further belt is connected to the elevator car support. In particular, each end is connected to a cross-member of the elevator car support. The further belt holds from below the first and second elevator car in each case on two sheaves which are each fastened to an associated elevator car. The further belt thus represents a bottom tensioning means that prevents the first and second elevator car from jumping in the event of an abrupt stop. As a result, even in the event of emergency braking, it is ensured that the first and the second elevator car remain essentially constantly in a stationary position in relation to the elevator car support.

DESCRIPTION OF THE DRAWINGS

Preferred exemplary embodiments of the invention are explained in more detail in the following description with the aid of the attached drawings, in which corresponding elements are provided with matching reference numerals. In the drawings:

FIG. **1** shows a schematic representation of an elevator system in accordance with a first exemplary embodiment of the invention;

FIG. **2** shows a schematic representation of the section of an elevator system which is labeled II in FIG. **1** in accordance with a second exemplary embodiment; and

FIG. **3** shows a schematic representation of the profile of a belt for an elevator system in accordance with a possible design.

DETAILED DESCRIPTION

FIG. **1** shows an elevator system **1** with at least one elevator car support **2** which can be displaced in a travel space **3** provided for the travel of the elevator car support **2**. The travel space **3** can, for example, be provided in an elevator shaft of a building.

The elevator car support **2** is suspended via multiple sheaves **5**, **6** from a traction means **8**. For greater clarity, the passage of the traction means **8** between the sheaves **5**, **6** has not been shown in FIG. **1**. In a common design, the traction means **8** is guided directly from the sheave **5** to the sheave **6**. The traction means **8** is moreover guided about a drive pulley **9** of a drive motor unit **10**. The elevator car support **2** is displaced upwards or downwards through the travel space according to the current direction of rotation of the drive pulley **9**.

A first elevator car **11** and a second elevator car **12** are arranged on the elevator car support **2**. The two elevator cars **11**, **12** can hereby be adjusted relative to the elevator car support **2**.

Cross-members **13**, **14**, **15**, connected to longitudinal members **16**, **17** of the elevator car support **2**, are formed on the elevator car support **2**. The sheaves **5**, **6** are arranged on the cross-member **13**. Moreover, a drive unit **18** is attached to the cross-member **13**. The drive unit **18** serves to drive a belt **19**. To do this, the belt **19** is guided about a drive wheel **20** of the drive unit **18**. One end **21** of the belt **19** is connected to the cross-member **13**. Another end **22** of the belt **19** is connected to the cross-member **14** of the elevator car support **2**. A longitudinal direction **24** of the elevator car support **2** is determined according to a direction of travel **24**. The longitudinal members **16**, **17** of the elevator car support **2** are hereby oriented along the longitudinal direction **24**. The cross-members **13** to **15** are arranged between the longitudinal members **16**, **17**, perpendicularly with respect to the longitudinal direction **24**.

In a region **25** between the cross-member **13** and the first elevator car **11**, the belt **19** is guided back and forth multiple times between the cross-member **13** and the first elevator car **11**. Starting from the fixed end **21**, the belt **19** is hereby guided initially counter to the longitudinal direction **24** to a sheave **26** fastened on the first elevator car **11**. The belt **19** is then guided about the sheave **26** and in the longitudinal direction **24** to a sheave **27** fastened to the cross-member **13**. Moreover, the belt **19** is then guided onwards, counter to the longitudinal direction **24**, to a sheave **28** fastened to the first elevator car **11**. The belt **19** is guided, transversely with respect to the longitudinal direction **24**, from the sheave **28** to a further sheave **29** fastened to the first elevator car **11**. The belt **19** is guided from the sheave **29**, initially in the longitudinal direction **24**, to a sheave **30** fastened to the cross-member **13**, and then in the opposite direction to the longitudinal direction **24** to a sheave **31** fastened to the first elevator car **11**, and then in the longitudinal direction **24** to the drive wheel **20** of the drive unit **18**. The belt **19** is hereby deflected both with respect to its first side **32** and with respect to its second side **33**. The first side **32** of the belt **19** is hereby applied to the drive wheel **20** of the drive unit **18**, whilst the second side **33** faces away from the drive wheel **20** in the region of the drive wheel **20**.

In this exemplary embodiment, the first elevator car **11** is arranged on a first member **34** which is guided in the longitudinal direction **24** on the elevator car support **2**. Moreover, the second elevator car **12** is arranged on a second member **35** which is guided in the longitudinal direction **24** on the elevator car support **2**.

The belt **19** runs from the drive wheel **20** of the drive unit **18** counter to the longitudinal direction **24** to a guide sheave **36**. Moreover, the belt **19** is guided about the guide sheave **36** and further guide sheaves **37**, **38**. The guide sheaves **36** to **38** are connected to the elevator car support **2**. The belt **19** is guided onwards from the guide sheave **38** to a guide sheave **39** which is connected to the cross-member **14**.

In a region **40**, the belt **19** is guided multiple times in and counter to the longitudinal direction **24**. The belt **19** is hereby guided back and forth between the cross-member **14** and the second elevator car **12**. The belt **19** thus runs from the guide sheave **39** counter to the longitudinal direction **24** to a sheave **41** which is connected to the second elevator car **12**, then in the longitudinal direction **24** to a sheave **42** connected to the cross-member **14**, and then counter to the longitudinal direction **24** to a sheave **43** connected to the second elevator car **12**. The belt **19** is moreover guided, transversely with respect to the longitudinal direction **24**, along the second elevator car **12** from the sheave **43** to a sheave **44** connected to the second elevator car **12**. The belt **19** is guided in the longitudinal direction **24** from the sheave **44** to a sheave **45** connected to the cross-member **14**, then counter to the longitudinal direction **24** to a sheave **46** connected to the second elevator car **12**, and then onwards in the longitudinal direction **24** to the cross-member **14**, the end **22** being connected to the cross-member **14**.

Moreover, in this exemplary embodiment a further belt **50** is provided which is designed in a corresponding fashion to the belt **19**. One end **51** of the belt **50** is hereby connected to the cross-member **14**. Another end **52** of the belt **50** is connected to the cross-member **15**. In this exemplary embodiment, the belt **50** has the function of holding the first elevator car **11** and the second elevator car **12** from below. Consequently, when for example an emergency braking operation is initiated, whilst the elevator car support **2** moves upwards through the travel space **3**, the braking forces are reliably transmitted from the elevator car support **2** to the two elevator cars **11**, **12**.

Starting from its end **51**, the belt **50** is guided in the longitudinal direction **24** about a sheave **53** connected to the first member **34**. The belt **50** is then guided, transversely with respect to the longitudinal direction **24**, to a further sheave **54** connected to the first member **34**. The belt **50** is guided from the sheave **54** counter to the longitudinal direction **24** along the side of and past the second elevator car **12** to a sheave **55**. The sheave **55** is hereby connected to the cross-member **15**. The belt **50** is guided from the sheave **55** in the longitudinal direction **24** to a sheave **56** connected to the second member **35**. The belt **50** is guided from the sheave **56**, transversely with respect to the longitudinal direction **24**, to a sheave **57**. The belt **50** is guided from the sheave **57**, counter to the longitudinal direction **24**, to the cross-member **15**, the end **52** being connected to the cross-member **15**.

In this arrangement, the two elevator cars **11**, **12** are suspended from the belt **19**. A pulley system for the first elevator car **11** is hereby formed in the region **25**. A pulley system for the second elevator car **12** is moreover formed in the region **40**. Because the two pulley systems have the same transmission ratios, the adjustment travels for the first elevator car **11** and the second elevator car **12** are also the same. The drive unit **18** is also, to a certain extent, arranged between the two pulley system arrangements. Thus, if the length of the belt **19** in the region **25** is shortened, the belt **19** in the region **40** is lengthened, and vice versa. If the first elevator car **11** is adjusted by the pulley system arrangement in the region **25** in the longitudinal direction **24** relative to the elevator car support **2**, the second elevator car **12** is thus adjusted relative to the elevator car support **2** counter to the adjusting direction **24**. The same applies in reverse. The elevator cars **11**, **12** are thus always adjusted in directly opposite directions. It should hereby be noted that the sheaves **27**, **30** of the pulley system arrangement in the region **25** are arranged immovably on the elevator car support **2**, and that the sheaves **42**, **45** are arranged, likewise immovably, on the elevator car support **2** via the cross-member **14**. Moreover, coordination with the belt **50** is thus ensured since shortening the belt **50** between the end **52** and the sheave **55** lengthens the distance between the sheave **55** and the end **51** by precisely the required amount. As a result, it can in particular be achieved that a predetermined tensile stress of the belt **50** is always maintained. For this purpose, the sheave **55** can be subjected to the action of a spring element **58**.

The belt **19** and the belt **50** serve different functions so that these different loads can be applied. It is hereby possible to adapt to the respective example of application in different ways. For example, it is possible to provide four belts **19**, guided in parallel, instead of a single belt **19**. It is also possible to provide two belts **50**, guided in parallel, instead of a single belt **50**. The belts **19**, **50** can hereby be guided via sheaves **26** to **31**, **41** to **46**, **53** to **57** and guide sheaves **36** to **39** which are designed with a corresponding width. As a result, uniformly designed belts can be used as the belts **19**, **50**. In this embodiment, the belt **19** is deflected both with respect to its first side **32** and to its second side **33**. For example, the belt **19** is deflected at the sheave **31** with respect to the second side **33**, whilst it is deflected at the sheave **30** with respect to the first side **32**. A deflection with respect to both sides **32**, **33** thus occurs in the pulley system arrangements in the regions **25**, **40**. This means that a deflection and a reverse deflection of the belt **19** occur as part of the belt guidance. However, it is hereby possible to optimize the available space and the total required length of the belt **19**.

Because the elevator cars **11**, **12** are each tensioned between the belts **19**, **50**, a high degree of stability of the elevator car support **2** with the elevator cars **11**, **12** can be obtained. As a result, it is also possible that the first elevator car **11** has a relatively great height and/or that the second elevator car **12** has a relatively great height. The extents of the elevator cars **11**, **12** in the longitudinal direction **24** can thus be preset to be relatively great. Moreover, a lateral spacing of the elevator cars **11**, **12** from the longitudinal members **16**, **17** can be reduced. It is hereby also advantageous that the belt **19** or the belt **50** can be guided close to the longitudinal members **16**, **17**, as a result of which the remaining space for the elevator cars **11**, **12** is increased further. A large part of the available shaft cross-section in the travel space **3** can thus be used by the elevator cars **11**, **12**.

FIG. **2** shows a schematic representation of the section of the elevator system **1** which is labeled II in FIG. **1** in accordance with a second exemplary embodiment. In this exemplary embodiment, a further sheave **60** is arranged next to the sheaves **26**, **28** on the first elevator car **11**. Furthermore, a further sheave **61** is arranged next to the sheaves **29**, **31**, on the first elevator car **11**. Moreover, a further sheave **62** is arranged next to the sheave **27** on the cross-member **13**. Furthermore, a further sheave **63** is arranged next to the sheave **30** on the cross-member **13**. In this exemplary embodiment, an alternative guidance of the belt **19** in the region **25** is shown for implementing a pulley system. In this pulley system arrangement, the belt **19** is guided clockwise from its end **21** about the sheave **60**, then the sheave **61**, the sheave **63**, the sheave **62**, the sheave **28**, the sheave **29**, the sheave **30**, the sheave **27**, the sheave **26**, the sheave **31**, a guide sheave **64** arranged on the cross-member **13**, and then a guide sheave **65** which is also arranged on the cross-member **13**. The belt **19** is then guided from the guide sheave **65** counter to the longitudinal direction **24** downwards along the side of the first elevator car **11**. A pulley system arrangement is thus formed in the region **25**, in which the belt **19** bears always with its first side **32** against the individual sheaves **26**, **27**, **28**, **29**, **30**, **31**, **60**, **61**, **62**, **63**, **64**, **65**. The belt **19** is thus always deflected with respect to its first side **32**. Reverse deflections are thus avoided or at least substantially avoided. The belt **19** can, however, also bear against individual guide sheaves **36** with its second side **33** and thus also be deflected somewhat with respect to the second side **33**. The guide sheave **64** can also be replaced by the drive wheel **20** of the drive unit **18**.

The belt **19** can thus only be guided on the first side **32** serving as the front side **32**, the second side **33** serving as a free back side **33**. Depending on the design of the belt **19**, the load on the belt **19** can consequently be reduced.

A pulley system arrangement can be formed in a corresponding fashion in the region **40** of the second elevator car **12**.

FIG. **3** shows a schematic representation of a profile of the belt **19** in accordance with a possible design. The belt **19** can be designed as a V-ribbed belt and have multiple ribs **70**, **71**, **72**. Each of the ribs **70** to **72** can hereby have an approximately V-shaped cross-section. In this exemplary embodiment, the design with ribs **70** to **72** is provided on the first side **32**. The second side **33** is flat in design. The belt **19** is thus profiled on one side, the first side **32**. The first side **32** hereby serves as a contact side. A belt of this type is used, for example, in the second exemplary embodiment illustrated with the aid of FIG. **2**.

The belt **19** can alternatively also be profiled on both sides **32**, **33**. Ribs can hereby be formed on the second side **33** as well, in a corresponding fashion to the ribs **70** to **72**. A belt **19** of this type is preferably used in the first exemplary embodiment described with the aid of FIG. **1**.

It is moreover possible that a belt **19** designed as a flat belt **19** is used. In the case of such a flat belt **19**, the first side **32** is also flat in design. The first side **32** is then hereby designed in a corresponding fashion to the second side **33**, as illustrated in FIG. **3**. However, a certain surface structure can hereby be provided in order to improve the friction when the belt interacts with the drive wheel **20** of the drive unit **18**. In this embodiment, either one of the sides **32**, **33** or both sides **32**, **33** can thus serve as contact sides.

Moreover, the belt **19** can also be designed as a toothed belt **19**.

In the case of a belt **19** that is flat in design on at least one of its sides **32**, **33**, the flat side **32**, **33** is preferably guided over a crowned sheave or the like. The guide surface of the crowned sheave is hereby convex in design. Also, the convex guide surface is preferably bordered by lateral shoulders in order to guide the belt **19**.

The invention is not limited to the exemplary embodiments described.

In accordance with the provisions of the patent statutes, the present invention has been described in what is considered to represent its preferred embodiment. However, it should be noted that the invention can be practiced otherwise than as specifically illustrated and described without departing from its spirit or scope.

The invention claimed is:

1. An elevator system has an elevator car support displaceable in a travel space provided for the travel of the elevator car support, a first elevator car adjustably arranged on the elevator car support, a second elevator car arranged on the elevator car support, a drive unit arranged on the elevator car support, and at least one belt, comprising:

the drive unit driving the at least one belt;

the at least one belt being coupled to the first elevator car wherein the first elevator car is adjustable relative to the elevator car support by the drive unit driving the at least one belt;

another belt having one end connected to the elevator car support and another end connected to the elevator car support, the another belt holding the first elevator car and the second elevator car from below; and

wherein starting at the one end, the another belt is guided upwards to sheaves fastened to the first elevator car, is guided onwards downwards along a side of the second elevator car to a sheave fastened to cross-member, is guided onwards upwards to two sheaves fastened to the second elevator car, and is guided onwards to the another end, the first elevator car and the second elevator car each being held from below in a loop of the another belt.

2. The elevator system according to claim **1** including a plurality of sheaves about which the at least one belt is guided, at least one sheave of the plurality of sheaves being attached to the elevator car support, and at least one other sheave of the plurality of sheaves being attached to the first elevator car, wherein the at least one sheave and the at least one other sheave form a pulley system for adjusting the first elevator car relative to the car support.

3. The elevator system according to claim **1** wherein the second elevator car is arranged adjustably on the elevator car support and is adjustable relative to the elevator car support by the drive unit driving the at least one belt, wherein the first elevator car and the second elevator car are adjustable in opposing directions.

4. The elevator system according to claim **3** including sheaves, on which the second elevator car is suspended via the at least one belt, are arranged on the elevator car support.

5. The elevator system according to claim **1** wherein the at least one belt has a first side and a second side opposite the first side, wherein the first side is a contact side on which the at least one belt is guided about a drive wheel of the drive unit and about a plurality of sheaves deflecting the at least one belt.

6. The elevator system according to claim **5** wherein a first end of the at least one belt is connected to a cross-member of the elevator car support, the at least one belt being guided from the first end to at least two sheaves that are fastened to the first elevator car, the at least one belt also being guided to at least two other sheaves that are fastened to the cross-member, wherein the at least one belt then is guided downwards along a side of the first elevator car, and between the first end and the at least two other sheaves attached to the cross-member, the at least one belt forming a loop in which the first elevator car is suspended, the at least one belt being deflected about the sheaves substantially in a same direction.

7. The elevator system according to claim **5** including at least one guide sheave interacting with a free back side of the at least one belt to guide the at least one belt.

8. The elevator system according to claim **1** wherein the at least one belt has a first side and a second side opposite the first side, the first side being a first contact side on which the at least one belt is guided about a drive wheel of the drive unit and about sheaves and with respect to which the at least one belt is deflected, and wherein the second side being a second contact side on which the at least one belt is guided about other sheaves deflecting the at least one belt.

9. The elevator system according to claim **1** wherein the at least one belt has at least one rib on a contact side.

10. The elevator system according to claim **9** wherein the at least one rib has an at least approximately V-shaped profile.

11. The elevator system according to claim **1** wherein the at least-one belt is a flat belt.

12. The elevator system according to claim **1** wherein the sheave fastened to the cross-member is connected to a spring element to maintain a predetermined tensile stress on the at least one belt.

13. An elevator system has an elevator car support displaceable in a travel space provided for the travel of the elevator car support, a first elevator car adjustably arranged on the elevator car support, a second elevator car arranged on the elevator car support, a drive unit arranged on the elevator car support, and at least one belt, comprising:

the drive unit driving the at least one belt;

the at least one belt being coupled to the first elevator car wherein the first elevator car is adjustable relative to the elevator car support by the drive unit driving the at least one belt;

wherein the at least one belt has a first side and a second side opposite the first side, wherein the first side is a contact side on which the at least one belt is guided about a drive wheel of the drive unit and about a plurality of sheaves deflecting the at least one belt, and the second side is a free back side maintained out of contact with the drive wheel and the plurality of sheaves; and

at least one guide sheave interacting with the free back side of the at least one belt to guide the at least one belt.

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